

## CLAIMS

1. A propulsion system for an amphibious vehicle comprising:  
a prime mover;  
5 marine propulsion means;  
land propulsion means;  
power transmission means, and  
control means for controlling adjustable parameters of each  
of the prime mover, marine propulsion means, land propulsion  
10 means, power transmission means and amphibious vehicle, wherein:  
the amphibious vehicle is operable either in a marine mode  
or in a land mode and when the power transmission means transmits  
power from the prime mover then the transmitted power is  
transmitted always to the marine propulsion means whether the  
15 vehicle is operated in the marine or land mode; whereby  
the power transmission means can deliver power from the  
prime mover only to the marine propulsion means when the vehicle  
is operated in the marine mode;  
the power transmission means can deliver power from the  
20 prime mover to both the marine propulsion means and the land  
propulsion means when the vehicle is operated in the land mode;  
and  
the control means comprises electronic processing means  
and/or electrical, mechanical, hydraulic or electromechanical  
25 actuation devices, or any combination thereof and is at least in  
part made available to a driver of the vehicle to enable the  
driver to select or control the individual parameters both in  
marine and land modes using a single actuation device for each  
parameter and/or each set of parameters.  
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2. A propulsion system as claimed in claim 1 wherein the  
control means enables the driver to select or control the  
following individual parameters:  
starting and stopping of the prime mover;  
35 marine or land mode;  
steering of the vehicle; and  
speed of the vehicle.

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3. A propulsion system as claimed in claim 1 or claim 2 wherein the speed of the vehicle both in marine and land modes is controlled by the driver using a single speed controller.
- 5 4. A propulsion system as claimed in any one of the preceding claims wherein the direction of the vehicle both in marine and land modes is controlled by the driver using a single steering controller.
- 10 5. A propulsion system as claimed in claim 4 wherein the single steering controller has a range of travel and the range of travel is the same both in marine and land modes.
- 15 6. A propulsion system as claimed in claim 5 wherein the range of travel of the single steering controller gives the driver access to the full range of vehicle steering available in marine and land modes.
- 20 7. A propulsion system as claimed in claim 6 wherein the ratio of the range of travel of the single steering controller to the range of vehicle steering available in marine and/or land modes is 1:1.
- 25 8. A propulsion system as claimed in claim 6 wherein the ratio of the range of travel of the single steering controller to the range of vehicle steering available in marine and/or land modes is other than 1:1.
- 30 9. A propulsion system as claimed in any one of the preceding claims wherein the power transmission means is a gearbox and the gearbox both in marine and land modes is controlled by the driver using a single gearchange controller.
- 35 10. A propulsion system as claimed in any one of the preceding claims wherein the control means made available to the driver is operable by the driver when driving in a first driving position when the vehicle is operated in the land mode and is also operable by the driver when driving in a second driving position

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more elevated than the first when the vehicle is operated in the marine mode.

5 11. A propulsion system as claimed in any one of the preceding claims wherein when the vehicle is operated in the marine mode the marine propulsion means can power the vehicle to a speed where sufficient hydrodynamic lift is achieved for the vehicle to plane.

10 12. A propulsion system as claimed in any one of the preceding claims wherein the land mode includes entry of the vehicle into the water and egress of the vehicle from the water.

15 13. A propulsion system as claimed in any one of the preceding claims wherein when the amphibious vehicle is operated in the land mode the power transmission means can simultaneously deliver power from the prime mover to both the marine propulsion means and the land propulsion means in equal or selectively variable proportions.

20 14. A propulsion system as claimed in any one of the preceding claims further comprising decoupling means for selectively decoupling and/or controlling the delivery of power from the prime mover to the land propulsion means.

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15. A propulsion system as claimed in any one of the preceding claims wherein the prime mover comprises any one or a combination of the following:

35 a spark ignition internal combustion engine;  
a compression ignition internal combustion engine;  
an electric motor;  
a fuel cell; or  
a hybrid engine.

16. A propulsion system as claimed in any one of the preceding claims wherein the marine propulsion means comprises one or more jet drives.

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17. A propulsion system as claimed in any one of the preceding claims wherein the land propulsion means comprises one or more drivable wheels.

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18. A propulsion system as claimed in any one of the preceding claims wherein the power transmission means is integral with the prime mover.

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19. A propulsion system as claimed in any one of the preceding claims wherein the power transmission means comprises a marine power transmitting means for transmitting power from the prime mover to the marine propulsion means and a land power transmitting means for transmitting power from the prime mover to the land propulsion means.

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20. A propulsion system as claimed in claim 19 wherein the marine and land power transmission means are of the same type.

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21. A propulsion system as claimed in claim 19 wherein the marine and land power transmission means are of different types.

22. A propulsion system as claimed in any one of claims 1 to 18 wherein the power transmission means is mechanical.

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23. A propulsion system as claimed in any one of claims 19 to 21 wherein the marine and/or land power transmission means is mechanical.

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24. A propulsion system as claimed in claim 22 wherein the mechanical power transmission means is a manual or automatic gearbox or continuously variable transmission for providing drive to the marine and land propulsion means.

25. A propulsion system as claimed in claim 23 wherein the marine and/or land power transmission means is a manual or automatic gearbox or continuously variable transmission for providing drive to the marine and/or land propulsion means.

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26. A propulsion system as claimed in any one of claims 1 to 18 wherein the power transmission means is hydraulic.

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27. A propulsion system as claimed in any one of claims 19 to 21, 23 or 25 wherein the marine and/or land power transmission means is hydraulic.

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28. A propulsion system as claimed in claim 26 wherein the hydraulic power transmission means includes one or more hydraulic pumps for generating hydraulic power.

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29. A propulsion system as claimed in claim 27 wherein the marine and/or land hydraulic power transmission means includes one or more hydraulic pumps for generating hydraulic power.

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30. A propulsion system as claimed in claim 26 or claim 28 wherein the hydraulic power transmission means includes one or more hydraulic motors for providing drive to the marine and land propulsion means.

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31. A propulsion system as claimed in claim 27 or claim 29 wherein the marine and/or land hydraulic power transmission means includes one or more hydraulic motors for providing drive to the marine and/or land propulsion means.

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32. A propulsion system as claimed in any one of claims 1 to 18 wherein the power transmission means is electric.

33. A propulsion system as claimed in any one of claims 19 to 21, 23, 25, 27 or 29 wherein the marine and/or land power transmission means is electric.

34. A propulsion system as claimed in claim 32 wherein the

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electric transmission means includes one or more generators, which may be alternators, for generating electric power.

5 35. A propulsion system as claimed in claim 33 wherein the marine and/or land electric transmission means includes one or more generators, which may be alternators, for generating electric power.

10 36. A propulsion system as claimed in claim 32 or claim 34 wherein the electric transmission means includes one or more electric motors for providing drive to the marine and land propulsion means.

15 37. A propulsion system as claimed in claim 33 or claim 35 wherein the marine and/or land electric transmission means includes one or more electric motors for providing drive to the marine and/or land propulsion means.

20 38. A propulsion system as claimed in any one of the preceding claims wherein the prime mover is located in the middle or rear of the amphibious vehicle.

25 39. A propulsion system as claimed in any one of the preceding claims wherein the prime mover is located such that its centre of gravity is positioned between 1.5m and 1.6m from the rear of an amphibious vehicle of 4.6m to 5.0m in length.

30 40. A propulsion system as claimed in claim 39 wherein the prime mover is located such that its centre of gravity is positioned substantially 1.54m from the rear of an amphibious vehicle of substantially 4.82m in length.

35 41. A propulsion system as claimed in any one of the preceding claims wherein the prime mover is arranged transversely in the amphibious vehicle in an East-West or West-East configuration.

42. A propulsion system as claimed in any one of the preceding claims wherein the prime mover is arranged in line in the amphibious vehicle in a North-South or South-North configuration.

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43. A propulsion system as claimed in any one of the preceding claims wherein the prime mover has an integral power take-off shaft which is used to provide power directly to the marine propulsion means.
44. A propulsion system as claimed in claim 43 wherein the prime mover has an integral gearing arrangement such that the power take-off shaft rotates at a speed different to that of the prime mover.
45. Use of a propulsion system as claimed in any one of claims 1 to 44 in an amphibious vehicle.
46. An amphibious vehicle incorporating a propulsion system as claimed in any one of claims 1 to 44.
47. An amphibious vehicle as claimed in claim 46, further incorporating one or more wheels which may be retracted above the water line for use on water, and protracted below the water line for use on land.
48. An amphibious vehicle as claimed in claim 47 wherein at least one of the one or more wheels is retracted by a fluid suspension arrangement.
49. An amphibious vehicle as claimed in claim 48 wherein the axis of at least one of the one or more wheels is retracted by at least 45 degrees.
50. An amphibious vehicle as claimed in claim 48 or claim 49 wherein the fluid suspension arrangement is hydraulic.
51. An amphibious vehicle as claimed in any one of claims 48 to 50 wherein the fluid suspension arrangement is gaseous.
52. An amphibious vehicle as claimed in any one of claims 48 to 51 wherein the suspension arrangement includes at least one

strut.

53. An amphibious vehicle as claimed in claim 51 wherein the at least one strut is also used for suspension in land mode.

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54. A propulsion system substantially as hereinbefore described with reference to or as shown in the accompanying drawings.

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55. Use of a propulsion system substantially as hereinbefore described with reference to or as shown in the accompanying drawings.

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56. An amphibious vehicle incorporating a propulsion system substantially as hereinbefore described with reference to or as shown in the accompanying drawings.